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# The Inextricable Link: Service-Academic Partnership for the Public's Health

Gabriel M Leung



SCHOOL OF PUBLIC HEALTH  
LI KA SHING FACULTY OF MEDICINE  
THE UNIVERSITY OF HONG KONG

## Agenda

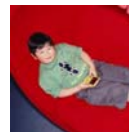
- Grand Challenges
  - Lost in Translation?



- Health Protection



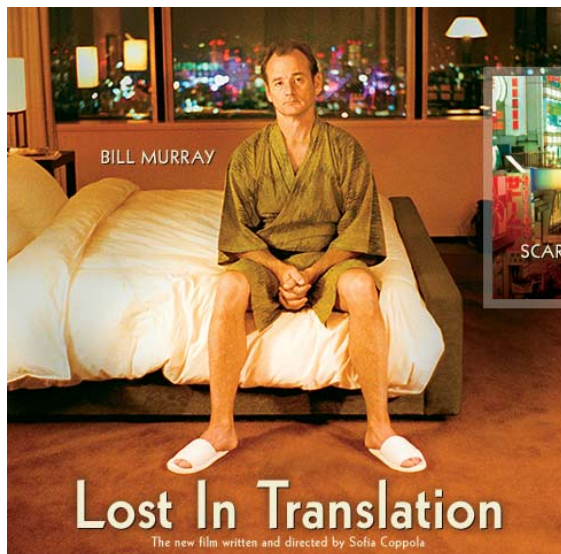
- Health Improvement



- Health Services and Systems

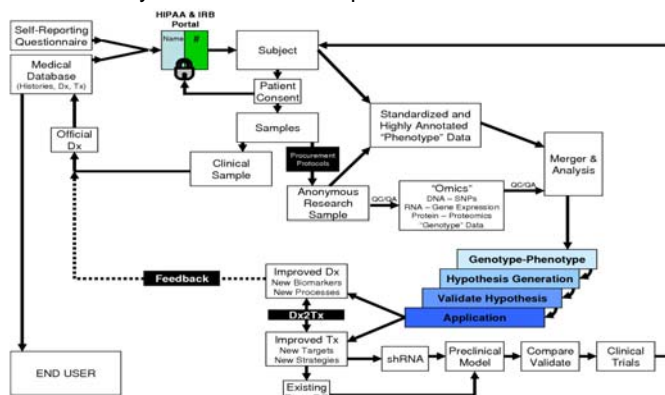


## Grand Challenges – Lost in Translation ?



## Grand Challenge 1 in Clinical Science

- How could one best translate research (especially in basic science) into clinical practice?
- A question of multi-directional technology transfer between:
  - laboratory and bedside → improved health



*J Translat Med 2004;2:35*

## Grand Challenge 2 in Clinical Science

- **Also** a question of multi-directional technology transfer between:
  - academia and industry → improved wealth
- Emphasis of value creation from the production of knowledge through research
- Facilitated over the years by:
  - legislation – Bayh-Dole Act (1984) in US and Allègre Innovation Laws (1999) in France, giving institutions performing publicly funded research IP rights, thus potential financial gains
  - commercial arms of research bodies – MRC Technology Co., INSERM Transfert, NIH Roadmap-Clinical and Translational Science Awards
  - funding – public, pharma and venture capital
- Whither Hong Kong, China and indeed much of Asia?
- How should we incentivise innovation?

## The Missing Link



*“Even if we stop all research today, we’d still be improving clinical care for the next 20 years bringing to practice all that we already know.”*  
 – a former president of RCP (London)

「議(研)而不決  
決而不行」

-朱鎔基

## Parallel Grand Challenge in *Translational Public Health*

- Little good comes of best, current evidence unless it is translated into public health policy, and the interventions then implemented expeditiously and effectively
- “Struggles with human behaviour and organisational inertia, infrastructure and resource constraints, and the messiness of proving the effectiveness of ‘moving targets’ under conditions that investigators cannot fully control”
- “Mastery of the ‘implementation science’ of fielding and evaluating interventions in real world settings and of the disciplines that inform the design of those interventions, such as clinical epidemiology and evidence synthesis, communication theory, behavioral science, public policy, financing, organizational theory, system redesign, informatics, and mixed methods/qualitative research”

JAMA 2008;299:211-3

## Grand Challenge in Translational Public Health

- Prerequisite: playing matchmaker between government and academics
- TRIP (Translating Research into Practice) grants from AHRQ in US; Studies in Health Services by HHSRF; Public Policy Research by RGC; some RFCID commissioned grants
  - however the invested amounts pale in comparison to those devoted to the clinical science grand challenges
  - “Disproportion has consequences, and the current policy of spending 1.5% (US) or 3.4% (HK) of (biomedical) research dollars on health services research is probably costing lives”

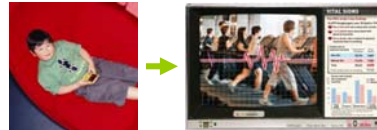
(JAMA 2008;299:221-3; UGC/RGC, RFCID and HHSRF statistics)

Are there examples of translational public health in action locally ?

- Health Protection



- Health Improvement



- Health Services and Systems



Health Protection  
– standing on guard for thee





Centre for Health Protection  
Department of Health  
The Government of the Hong Kong Special Administrative Region

## Scientific Committee on Advanced Data Analysis and Disease Modelling



1st Row (From Left to Right)  
Mrs LEUNG YIM Sai-hun, Chair Member, Dr SO Shui-huen, Joanne SMO, C-IP, Professor GORDON LUNG (Chairman),  
Professor WONG Tsz-ung (Member), Dr Steven RILEY (Member)

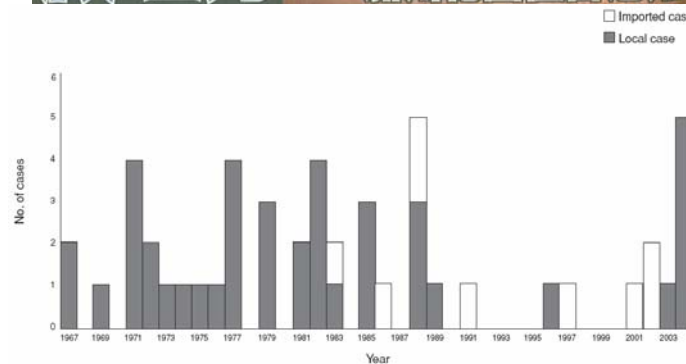
2nd Row (From Left to Right)  
Dr LEUNG Chi-chiu (Member), Dr HO Lai-ming (Member), Dr WU Tsz-ke, Joseph (Member), Mrs EDWINA SI-HUNG (Member),  
Dr TO May-hei, Lisa (Former Secretary), Dr IP Kai-ming, Dennis (Member)

### Papers Discussed / Recommendations

- Report on a Comparison of Methods for Early Detection of the Influenza Peak Season in Hong Kong (2005)
- Report on the Transmission of Japanese Encephalitis in Hong Kong (2005)
- A Review of Pandemic Preparedness Plans and Modelling Studies on Pandemic Influenza (2006)
- Effectiveness of Inactivated Influenza Vaccine in Older Adults – a Literature Review (2007)
- Modelling the Impact of Human Papilloma Virus Vaccine – a Literature Review on the Assumptions, Models and Findings (2007)

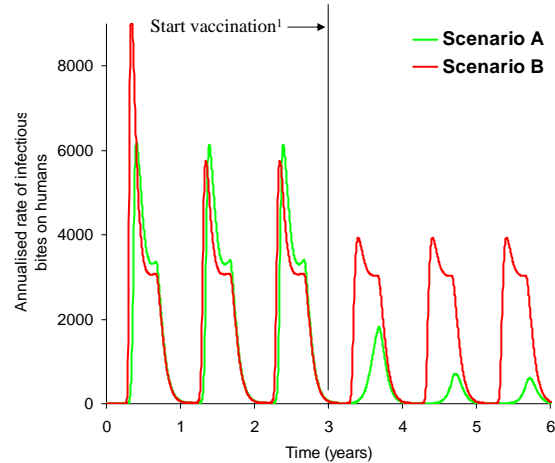


## Hong Kong's preparedness for influenza pandemic - Prevention and Protection



## 2 plausible but very different scenarios are consistent with current data: JE in HK

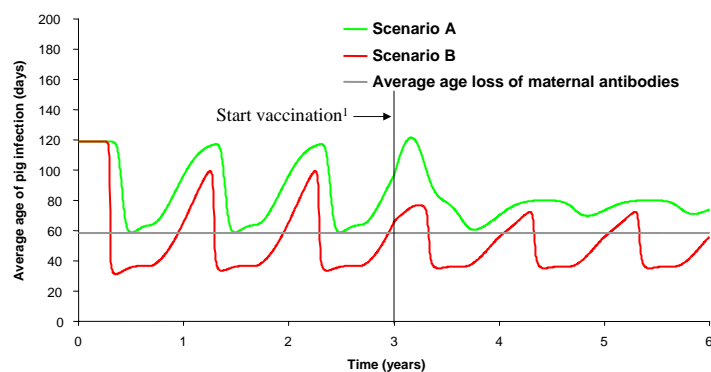
Parameter	Scenario	
	A	B
$N_M$	100K	100M
$w_p$	20	0.1
$V_S$	35	100
$w_h$	0.35	0.0001



1) 2 doses: one at day 55 and the other at day 83. Both doses to be 100% effective on piglets not protected by maternal antibodies.

Data from field studies are required before success of swine vaccination can be evaluated

## Difference in vaccine efficacy largely driven by different average ages of infection



1) 2 doses: one at day 55 and the other at day 83. Both doses to be 100% effective on piglets not protected by maternal antibodies.

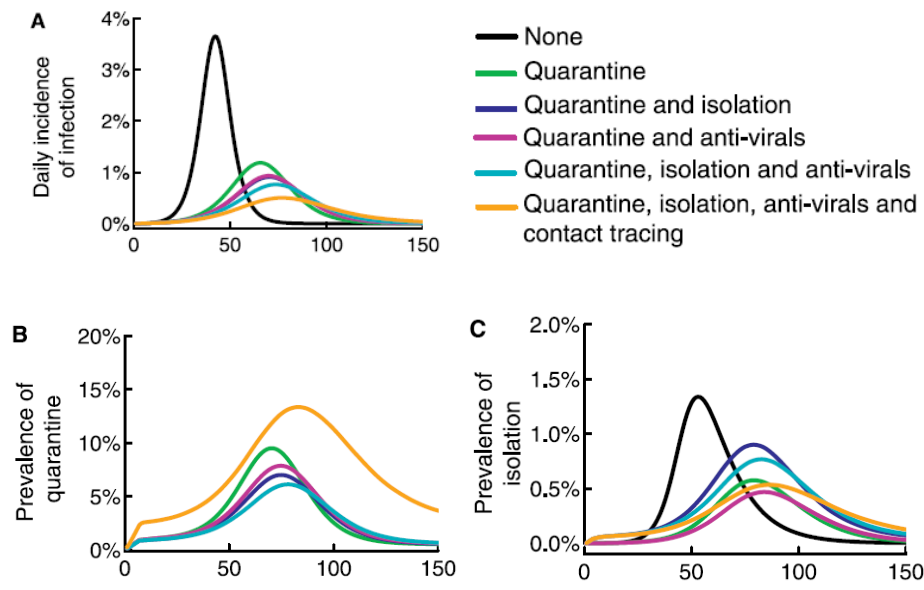
A longitudinal study of piglet viraemia could be used to distinguish between these scenarios



## Pandemic Influenza Mitigation Tripod



## Public health interventions



## Symptomatic attack rates could be reduced substantially by these interventions

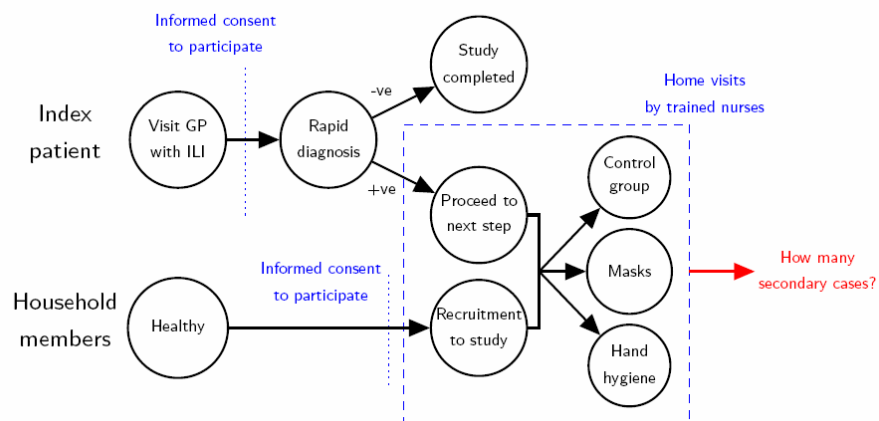
	Symptomatic attack rate	Peak prevalence of quarantine	Peak prevalence of isolation	Anti-viral doses required
Baseline (no intervention)	49%	-	1.4%	0.9
Quarantine	33%	9.8%	0.6%	0.6
Quarantine and isolation	29%	7.3%	0.9%	1.2
Quarantine and anti-virals	29%	8.2%	0.5%	3.9
Quarantine, isolation and anti-virals	27%	6.4%	0.8%	3.9
Quarantine, isolation, anti-virals and contact tracing	23%	14.0%	0.6%	9.9



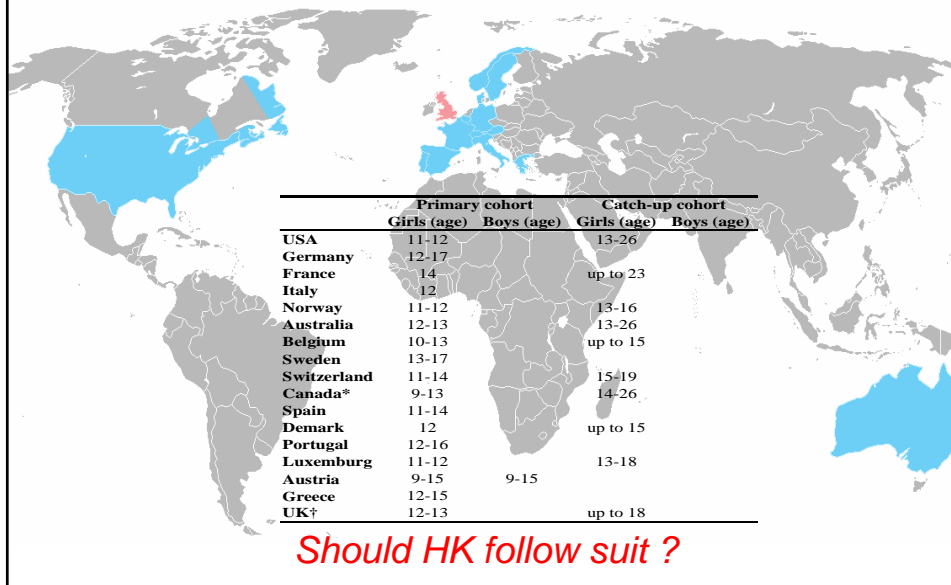
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

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## Countries that have approved/implemented universal HPV vaccination



## Cervical Cancer Prevention

- Comparator of status quo
  - Does  Cervical Screening Programme work?
    - process measures (average and distribution of coverage)
  - Will it work?
    - modelling (2 different approaches)
    - cytology or HPV testing; and in what order?
- Marginal economic analysis
  - What does  add, in terms of QALYs?
  - At what cost? Who should pay?
  - Is it acceptable to girls (boys), parents and the general public?

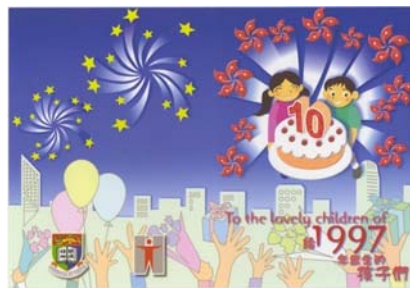
## Health Improvement – adding years to life, and life to years



## Children of 1997 – the study

All births in Hong Kong in April and May 1997

1. 8327 infants participated, recruited through all MCHCs
2. Interviewed at 3, 9 and 18 months



Collaboration between

1. The University of Hong Kong
2. Department of Health



Designed to answer many, many questions

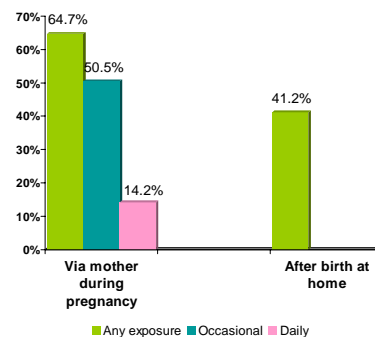
1. Smoking (in utero & postpartum)
  2. Breastfeeding
  3. Method of delivery
- ...& health care use



## The “Marlboro” (not Mozart) effect



## Infant SHS exposure before and after birth among non-smoking mothers (95.4% of sample)



## Health and Economic Consequences

**Table 3** Costs of health services utilisation in the first year of life attributable to ETS exposure during pregnancy for the 1997 annual birth cohort

	Crude OR	Adjusted OR*		PAR (%)		Extra number of episodes attributable to ETS	Total extra cost (US\$1000)	Relative contribution to the cost (%)	
		Point estimate	95% CI	Point estimate	95% CI			Private sector	Public sector
Consultation									
Respiratory/fever	1.20	1.19	(1.08 to 1.31)	6.0	(2.6 to 9.4)	10274	273	89.2	10.8
Any illness	1.28	1.26	(1.14 to 1.39)	7.7	(4.3 to 10.9)	16192	437	87.3	12.7
Hospitalisation									
Respiratory/fever	1.14	1.11	(0.98 to 1.27)	5.7	(-1.3 to 12.2)	N/A	N/A	N/A	N/A
Any illness	1.20	1.18	(1.05 to 1.31)	7.4	(2.3 to 12.2)	1581	2142	18.3	81.7

OR, odds ratio; CI, confidence interval; PAR, population attributable risk.

N/A denotes items not calculated because the associated PARs did not achieve statistical significance at the 0.05 level.

\*Odds ratios are adjusted for maternal education level, maternal full time employment, maternal age, birth order, method of delivery, birth weight, and breast feeding.

- The cost of inpatient and outpatient care (excluding preventive care episodes) for an annual cohort of infants in the first year of life attributable to SHS is conservatively estimated to be >HK\$30M
- This is about 10% of the total cost of direct medical care for these infants

## Moderating effect of smoking hygiene

Smoking Category	Proportion Exposed to Each Smoking Category, %	Respiratory Tract or Febrile Illness			Any Illness		
		Proportion Ever Hospitalized, %	OR (95% CI)	P Value for Linear Trend	Proportion Ever Hospitalized, %	OR (95% CI)	P Value for Linear Trend
In utero							
Maternal smoking or secondhand smoke exposure during pregnancy†							
No	33.2	16.7	1 (NA)	.05	26.0	1 (NA)	.008
Exposure to secondhand smoke	62.2	18.8	1.09 (0.95-1.25)		29.6	1.15 (1.02-1.29)	
Active smoking	4.6	23.8	1.37 (1.02-1.84)		34.6	1.33 (1.02-1.73)	
P value		.003			<.001		
After birth							
Maternal smoking‡							
No	97.2	18.2	1 (NA)	.35	28.6	1 (NA)	.63
Yes, but not within 3 m	2.2	21.1	1.11 (0.75-1.64)		30.1	1.00 (0.71-1.42)	
Yes, within 3 m	0.6	28.9	1.33 (0.67-2.63)		40.0	1.23 (0.66-2.29)	
P value		.12			.22		
Paternal smoking§							
No	66.6	17.4	1 (NA)	.13	27.4	1 (NA)	.19
Yes, but not within 3 m	26.3	19.2	1.01 (0.87-1.17)		29.8	0.99 (0.87-1.12)	
Yes, within 3 m	7.1	23.9	1.28 (1.01-1.61)		35.7	1.23 (1.00-1.51)	
P value		<.001			<.001		
Other smokers at home							
No	84.8	17.8	1 (NA)	.14	27.8	1 (NA)	.04
Yes, but not within 3 m	10.9	20.5	1.06 (0.88-1.29)		32.5	1.12 (0.95-1.32)	
Yes, within 3 m	4.4	23.2	1.22 (0.93-1.61)		35.2	1.22 (0.95-1.56)	
P value		.01			<.001		
Any smoker at home¶							
No	58.8	17.2	1 (NA)	.07	27.1	1 (NA)	.03
Yes, but not within 3 m	30.8	18.9	0.99 (0.86-1.15)		29.5	1.00 (0.88-1.13)	
Yes, within 3 m	10.4	23.2	1.27 (1.04-1.55)		35.4	1.28 (1.07-1.52)	
P value		<.001			<.001		

## Policy implications

- Broadens the issue from solely maternal smoking in pregnancy to that of the whole household
- Directly informed the debate on 2007 enactment of the Smoking (Public Health) Ordinance
- Suggests that targeted smoking cessation programmes for fathers and other family members during pregnancy may be useful (*vide* Sophia Chan's work)
- Smoking hygiene can be a possible harm reduction interim measure



"Oh boy. That habit is gonna cost us..." Illustration by Jack Maggioni, MD



## Controversy, Confusion and Obfuscation...

News headlines

### **The New York Times** *Some Extra Heft May Be Helpful, New Study Says*

#### Some Unexpected Findings

People who are overweight but not obese have a lower risk of death than those at a normal weight, according to a new study. Those who are very thin or obese, however, are at a higher risk of death.



Food industry-supported pressure group infomercials

Obesity:  
~~“Epidemic”~~  
~~“Problem”~~  
~~“Threat”~~  
~~“Issue”~~  
**“Hype”**

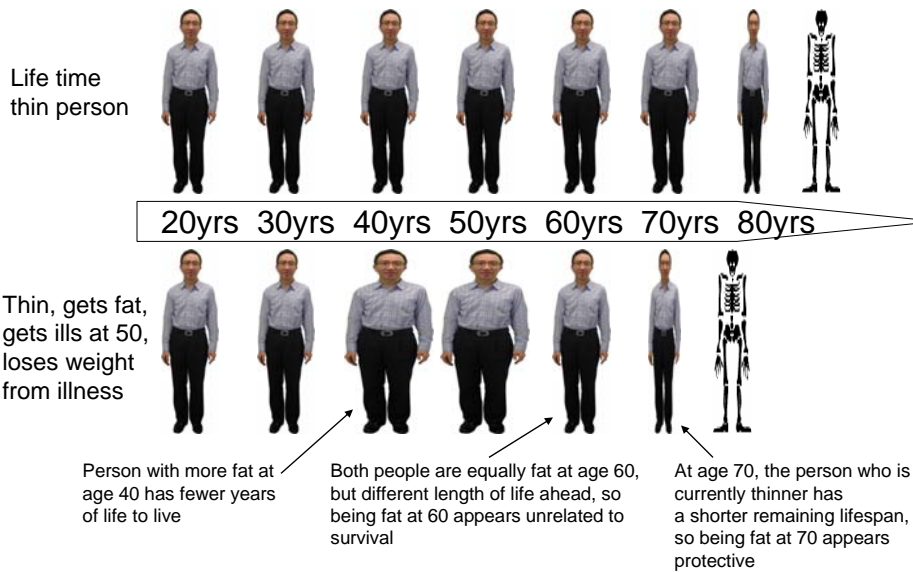
Americans have been force-fed a steady diet of obesity myths by the “food police,” trial lawyers, and even our own government.

Learn the truth about obesity at:

[ConsumerFreedom.com](http://ConsumerFreedom.com)

The Center for Consumer Freedom is a nonprofit organization dedicated to protecting consumer choice and promoting common sense.

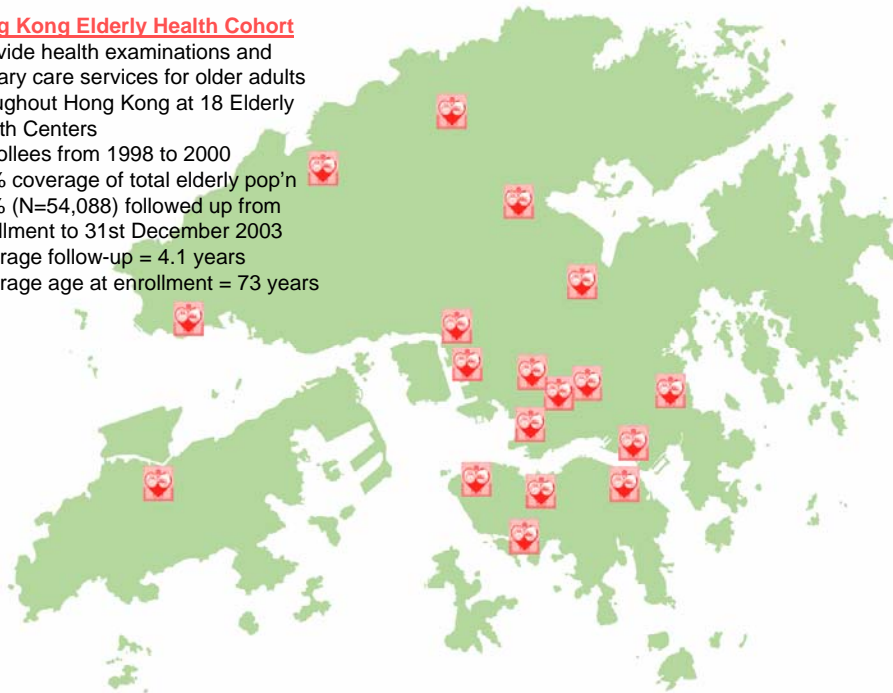
## Why ? – Life time perspective



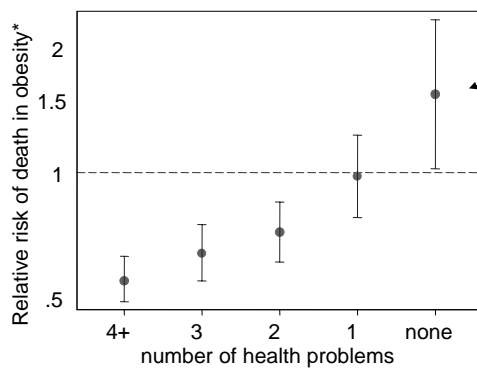
*Do changes in weight and body composition due to ill-health at older ages bias these comparisons?*

### Hong Kong Elderly Health Cohort

- Provide health examinations and primary care services for older adults throughout Hong Kong at 18 Elderly Health Centers
- Enrollees from 1998 to 2000
- ~5% coverage of total elderly pop'n
- 96% (N=54,088) followed up from enrollment to 31st December 2003
- Average follow-up = 4.1 years
- Average age at enrollment = 73 years



### Obesity affects mortality in healthy and unhealthy older people differently

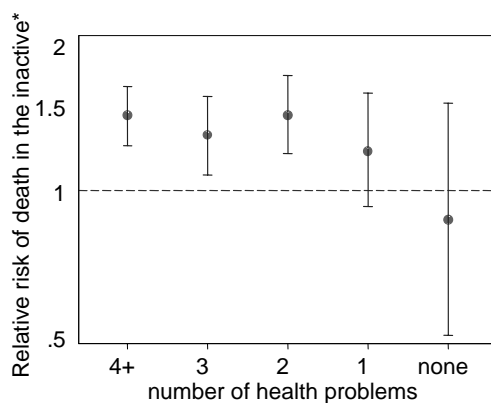


\* Obese people compared with normal weight people with the same number of health problems, adjusted for other differences

For older people in good health, 54% higher risk of death in obese compared with normal weight



## Physical activity in healthy and unhealthy older people



\* Inactive people compared with physically active people with the same number of health problems

## Public Health Implications

- Research suggesting that fatness is not a risk factor and that physical activity does not matter for mortality is biased
- Obesity and inactivity c(w)ould become an overwhelming public health problem in China
- Interventions to prevent obesity at all ages are needed now
- BMI (weight and height) alone is an imperfect measure of health risk, and should be supplemented by waist circumference, waist-hip ratio, % body fat, especially in older adults. EHS has already started to measure some of these routinely.

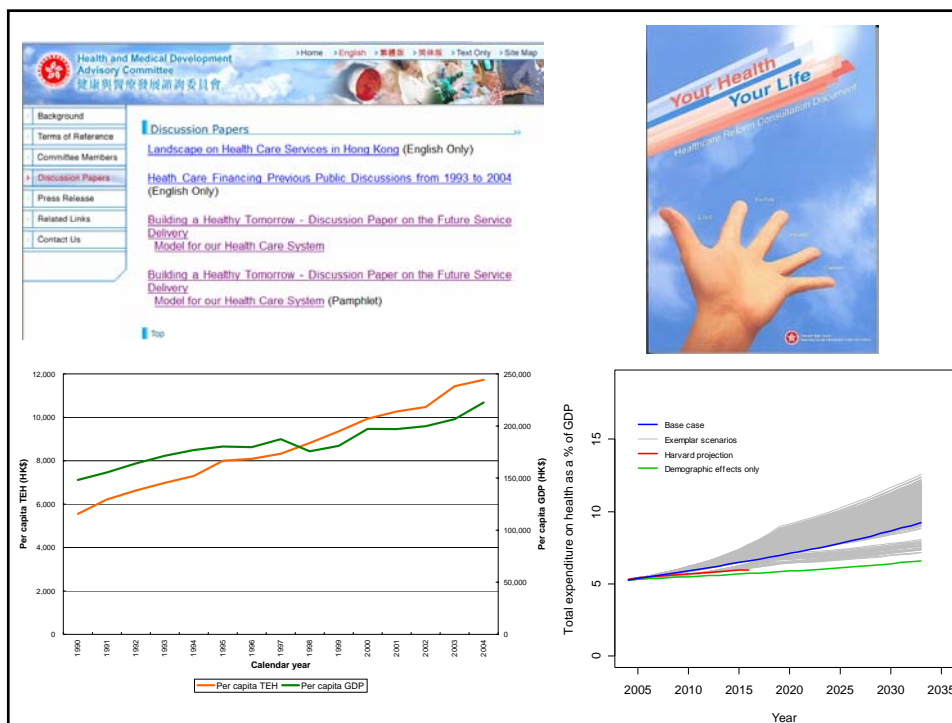


**Elderly Health Service**

Department of Health

The Government of the Hong Kong Special Administrative Region

# Health Services and Systems – somewhere over rainbow... (perhaps) lies the promised land



## Thank You...*(in order of appearance)*

- Research collaborators: Steven Riley (JE), Joe Wu (PanFlu), Ben Cowling (NPI), Pauline Woo (HPV), TH Lam ("Children of 1997"), Mary Schooling (EHS cohort), Keith Tin (health financing)
- Sponsors: RFCID (commissioned projects and investigator-initiated grants), US CDC, HHSRF, FHB
- Translational partners: CHP; HA; EHS, DH; FHB

*To us, knowledge, how good and lovely soever it be for its own sake, must always be a by-end, a step merely towards the still better and lovelier goal of "good-will towards men."*

*Our object, then, in reviewing these researchers, and in adding to them such observations as our own sphere of action supplies, should be to deduce from them rules of practice, to gather from the tree of knowledge fruit for the solace and refreshment of mankind.*

Thomas King Chambers  
Goulstonian Lecture, RCP, 1850